REMARKS

I. STATUS OF THE CLAIMS

Claims 21-38 and 42-52 are pending in this application. Claims 21, 31-33, and 47-52 have been amended to more particularly point out and distinctly claim the present invention. Specifically, the claims, as well as page 4 of the specification, have been amended to recite that the presently claimed compositions comprise, among other things, at least one branched sulfonic adhesive polymer having a Brookfield thermosel viscosity at 177°C of about 35,000 cP (mPa·s). The amendments are supported by the originally filed specification, e.g., at page 4, and the examples, which all refer to the Eastman polymer AQ 1350. As described in greater detail below, the Eastman polymer AQ 1350 is known, and was known at the time of the filing of the present application, to have certain properties including the Brookfield viscosity now claimed. Accordingly, no new matter has been added by these amendments, nor do these amendments raise new issues or necessitate the undertaking of any additional search of the art by the Examiner.

In addition, Applicants' representatives wish to thank the Examiner for the courtesies extended to them during several telephone conferences held during the last few months. The amendments and remarks submitted herewith are intended to supplement and clarify the discussion of that date.

II. REJECTION UNDER 35 U.S.C. § 112, FIRST PARAGRAPH

Claims 21-38 and 42-52 are rejected under 35 U.S.C. § 112, first paragraph, for allegedly containing new subject matter, "which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed invention." Office Action at 2. Specifically, the Examiner contends that there is no support in the specification for the expression "branched sulfonic" adhesive polymer. Her position is that there is support in the specification only for one polymer, namely Eastman AQ 1350, and that recitation of the genus within which it falls (branched sulfonic adhesive polymers) is not supported.

Although Applicants respectfully disagree with the Examiner, they have further amended the claims herein to recite that the adhesive polymer is a branched sulfonic adhesive polymer having a Brookfield thermosel viscosity at 177°C of about 35,000 cP (mPa·s). As discussed with the Examiner on the phone, even though the Examiner is effectively requesting Applicants to limit their claims to recite only AQ 1350 as the adhesive polymer, Applicants cannot amend the claims to recite the AQ 1350 polymer per se because (1) the trade name of a compound cannot be claimed, and (2) Eastman has not made the structure or chemical name of this polymer publicly available. However, using a number of Eastman's publicly available brochures about its AQ polymers as guidance, the claims as amended now reflect several physical parameters that one skilled in the art would recognize as specifically defining the AQ 1350 polymer, namely, that it is adhesive, branched, sulfonic, and has a Brookfield thermosel viscosity at 177°C of about 35,000 cP (mPa·s). The specification has also been amended to reflect this viscosity. To support their amendments, Applicants direct the Examiner to the brochure previously submitted as Appendix B to the Reply filed June 9, 2004 (page 2), the January 2001 Sales Specification and Product Data Sheets submitted as the Appendix to the Amendment filed May 25, 2005 (page 2), and the presently submitted

brochure entitled "Eastman AQ Polyesters: Water-Dispersible Hot Melt Adhesive Raw Materials," (page 3, Table 2).

Thus, the present amendment results in the claiming of the specific properties of the AQ 1350 polymer in the pending claims. Since the structure and specific chemical name of AQ 1350 are not publicly available, and in light of the disclosure of AQ 1350 in the originally filed specification, these parameters of AQ 1350 now claimed "reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention." In other words, the originally-filed specification disclosed AQ 1350, but since the rules of the U.S. PTO preclude Applicants from claiming it by it trade name and its chemical name is not publicly available, Applicants have effectively functionally claimed it by the present amendment to the claims and by adding the support in the specification based on the known properties of the polymer at the time of filing. The amendments to the specification and claims are thus fully supported under 35 U.S.C. §112 and accordingly should be entered and the claims allowed.

III. CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request the reconsideration of this application and the timely allowance of the pending claims.

If the Examiner believes a telephone conference could be useful in resolving any of the outstanding issues, she is respectfully urged to contact Applicants' undersigned counsel at 202-408-4454.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P.

Dated: August 24, 2006

By: Thalia V. Warnement
Reg. No. 39,064

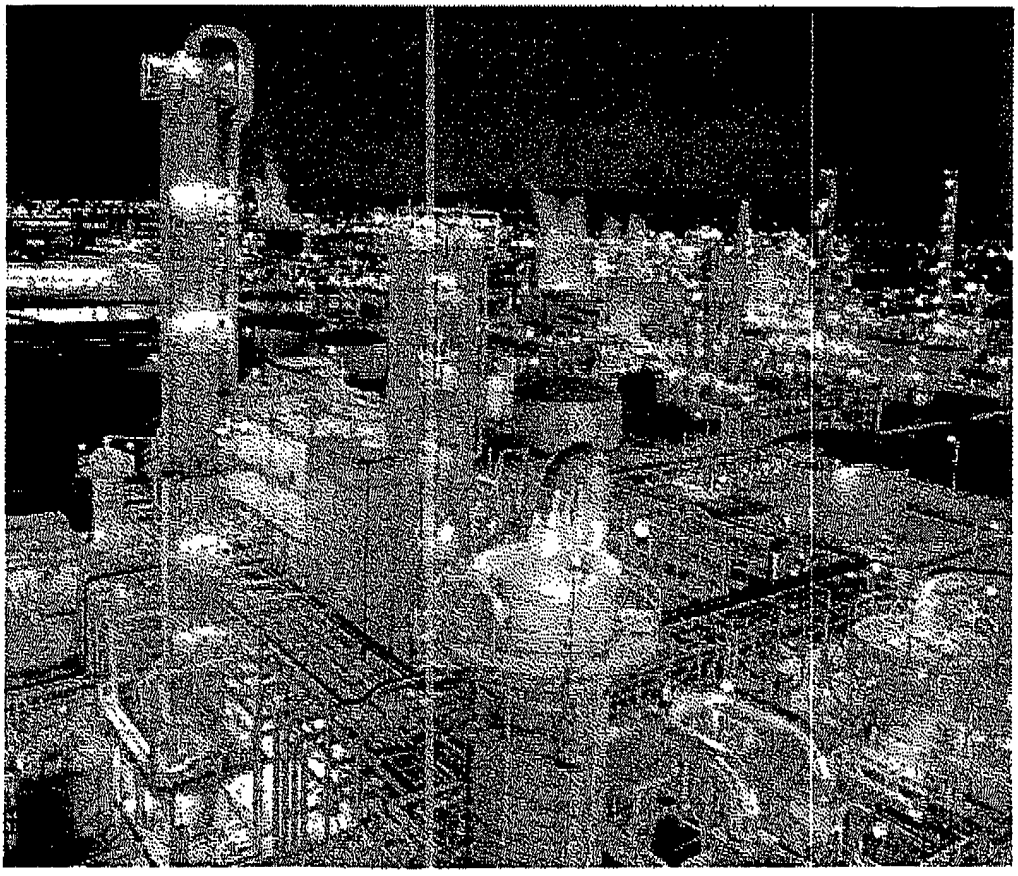
Attachment: Brochure entitled "Eastman AQ Polyesters: Water-Dispersible Hot Melt Adhesive Raw Materials"

Eastman AQ Polyesters

Water-Dispersible Hot Melt Adhesive Raw Materials

EASTMAN

Contents



Eastman AQ Polyesters

Water-Dispersible Hot Melt Adhesive Raw Materials

Introduction

Hot melt adhesives are useful for bonding various substrates such as wood, paper, plastics, nonwoven assemblies, textiles, and other materials. These applications call for high bond strength to resist shock, stress, high humidity, and extreme temperatures encountered in transportation and storage. In addition, the melt point, wetting time, initial tack, setting time, pot life, and general handling characteristics on automatic machinery are essential considerations.

In response to a need for water-dispersible and repulpable hot melt adhesives, Eastman Chemical Company developed a family of water-dispersible branched and linear sulfopolyesters for use in hot melt and aqueous repulpable formulations. The products include *Eastman AQ* 1045, *AQ* 1350, *AQ* 950, and *AQ* 14000.

Eastman's branched sulfopolyesters can have a distinct odor that is not desirable in selected applications. To meet this need, Eastman developed AQ 2150 and AQ 2350, which are odorless water-dispersible sulfopolyesters. The new odorless polyesters represent the advantages of both the linear and branched compositional families. The water-dispersible polyesters, either branched or linear types, are suitable for base polymers in applications such as hot melt, nonwoven, packaging, and tape and label pressure sensitive adhesives.

Product Function

These products are inherently water-dispersible because of the ionic functionality of the 5-sodiosulfoisophthalate units within the polyester backbone. Adhesive formulations employ hydrophobic raw materials such as tackifying resins and plasticizers. Tackifying resins which are compatible with AQ polymers include polar resins such as *Staybelite* Resin-E and *Picco* 6100 for example. Compatible plasticizers include benzoate products, such as *Benzoflex* 9-88 and *Benzoflex* 352.

Among the applicable stabilizers or antioxidants that may be used are hindered phenols such as *Irganox* 1010. The water-dispersible polyesters are manufactured with both primary and secondary antioxidants.

These finished adhesives are rendered water-dispersible by the surfactant nature of sulfopolyesters. The same ionic nature that results in water-dispersibility also prevents solubility in ion-containing body fluids.

Incorporation Into Adhesive Formulations

These unique polyesters can be combined with a wide range of other commonly used adhesive raw materials. AQ polymers are commonly incorporated in adhesive formulations at levels of 60% and above to ensure water-dispersibility of the entire adhesive composition. The compounding of either branched or linear AQ polymers with raw materials is easily performed with melt tanks incorporating propeller-type mixers. High intensity dispersion mixers are not necessary.

AQ polymers are supplied in batch inclusion bags, which provide simple and trouble-free mixing. Customers merely add a 10-pound block of AQ polymer, including the wrapper, to the hot melt mixer. Completely compatible with *Eastman AQ* polymer, the bag does not change product performance attributes such as water-dispersibility or adhesive formulation properties.

Inclusion bags also offer many other benefits for the manufacturing process. Supplied in batch inclusion bags, *Eastman AQ* polymer eliminates the possibility of contamination during weighing and improves the overall cleanliness of the mixing area.

Boosting productivity and cutting costs are top priorities for many companies in today's economy, and inclusion bags can help improve productivity and decrease costs in the manufacturing process. There is no wrapper to remove, and the entire package goes into the mixer. This not only saves time, it also reduces clean up due to spillage. Another advantage is lower solid waste disposal costs because the wrapper melts in the mixing process.

Eastman AQ water-dispersible adhesive raw materials packaged in convenient batch inclusion bags are AQ 1045, AQ 1350, AQ 1950, AQ 2150, and AQ 2350. The packaging concept consists of a 40-pound box containing four blocks of AQ polymer, each weighing 10 pounds.

Key Benefits

- 100% water-dispersible
- Repulpable under neutral and alkaline conditions
- Nondispersible in ionic solutions such as body fluids
- Easily formulated with a variety of polar tackifiers, waxes, and plasticizers to meet customer needs
- Odorless products AQ 2150 and AQ 2350
- Excellent adhesion to polyolefin substrates
- Wide range of melt viscosities
- Regulated by FDA 21 CFR 175.105 for use in food-packaging adhesives
- TSCA and MITI approved
- Nonskin irritant

Physical Properties

Table 1

Typical Properties of Water-Dispersible Adhesive Raw Material Sulfopolyesters

Typical Properties	AQ 1045	AQ 1350	AQ 1950	AQ 14000	AQ 2150	AQ 2350
Structure	Branched	Branched	Branched	Branched	Linear	Linear
Odor	Slight	Slight	Slight	Slight	None	None
Brookfield thermosel viscosity[a] @ 177°C, cP	4,500	35,000	95,000	400,000	15,000	39,000
RBSP, °C	85	105	115	133	80	92
T_g (DSC), °C	−5	−2	3	7	9	11
Gardner color (molten), max.	4	4	4	4	5	5
Hydroxyl number	47	51	57	51	16	12

[a]Brookfield *thermosel viscosity RVDV-1+, 12 g of each sample conditioned at 90°C for 16 h in a vacuum oven prior to testing.*

Applications

Case/Carton Closing—Using the key criteria of low viscosity and fast set time, a starting-point formulation using *Eastman AQ* 1045 polyester as the base polymer was identified. It is compared to conventional EVA- and PE-based adhesives in Table 2. The water dispersible polyester-based formulation compared favorably to the performance characteristics of the conventional adhesives for elevated-temperature performance and setting characteristics. *Eastman AQ* 1045 is 100% repulpable in neutral or alkaline conditions.

Multiwall Bags—A formulation using *Eastman AQ* 1950 polyester as the base material for use in multiwall bag end seam applications. This formulation is compared to a typical PE-based adhesive in Table 3. Again, the polyester-based composition compared favorably to the conventional adhesive in elevated-temperature performance, yet it is fully repulpable under alkaline conditions. This makes the polyester-based formulation ideally suited for such applications as beater bags.

PET Bottle Label Adhesive—Formulations using *Eastman AQ* 1045 polyester should find use for PET bottle labeling. A formulation with many desirable properties for a label adhesive is shown in Table 4. This formulation demonstrates excellent adhesion to PET and good bond strength at 120°F and at 35°F, low ring and ball softening point, and low viscosity at application temperature. This formulation is also completely dispersible in neutral and alkaline repulping conditions.

Nonwoven Product Assembly Adhesive—*Eastman AQ* 1350, odorless *AQ* 2150, and *AQ* 2350 are beneficial in nonwoven applications. A starting formulation is shown in Tables 5 and 7. The polyester formulation has excellent adhesion to polyethylene films, *Brookfield* Thermosel viscosity between 1,000–2,000 cP at 177°C, and a low ring and ball softening point of 77°C. Because of the polyester's nondispersibility in ionic solutions such as body fluids, it should provide superior performance in nonwoven applications. This formulation is fully repulpable in alkaline conditions.

Pressure-Sensitive Adhesives—*Eastman AQ* water-dispersible polyesters should also benefit pressure-sensitive adhesive applications. As shown in Table 6, they can be modified to exhibit high levels of tack and moderate holding power. These formulas also have good adhesion to polyethylene and polypropylene and exceptional adhesion to PET. They also exhibit fiber-tearing quick tack to paper substrates. In repulpability tests, the two-component combination of *Eastman AQ* 1350 and *Benzoflex* 9-88 was completely repulpable in all conditions; the three-component formula using *Eastman AQ* 14000, *Staybelite* resin-E, and *Benzoflex* 9-88 was 70% repulpable in neutral conditions and completely repulpable in alkaline conditions.

Additional pressure-sensitive adhesive applications based on these branched sulfopolyesters include medical tapes that are removable by water but are resistant to ionic fluid such as perspiration.

Table 2

Hot Melt Packaging Formulations

Eastman AQ Formulations	Wt %	EVA- and PE-Based Hot Melts	Wt %		Wt %
Eastman AQ 1045	60.0	Typical EVA, HMA	100	Typical PE, HMA	100
Picco 6100	31.0				
Benzoflex 352	8.7				
Irganox 1010	0.1				
Cyanox 1212	0.2				
Test Properties					
Viscosity @ 177°C, cP (ASTM D3236)	1,886		900		960
RBSP, °C (ASTM E28)	84		112		108
Set time, s	3.1		1.7		2.6
SAFT, °C	75		96		92
PAFT, °C	40		58		65
Repulpability,[a] %	100		NA		NA

[a] *73°F, pH 11*

Table 3

Hot Melt Multiwall Bag Adhesive Formulations

Eastman AQ Formulation	Wt %	PE-Based Hot Melt	Wt %
Eastman AQ 1950	70.0	Typical PE, HMA	100
Picco 6100	20.0		
Benzoflex 352	9.7		
Irganox 1010	0.3		
Test Properties			
Viscosity @ 177°C, cP	18,450		32,100
RBSP, °C	102		106
SAFT, °C	85		99
PAFT, °C	60		68
Repulpability, alkaline conditions,[a] %	100		NA

[a] *73°F, pH 11*

Table 4

PET Label Adhesive Formulation Using *Eastman AQ* 1045

Ingredients	Wt %
Eastman AQ 1045	60.0
Staybelite Resin-E tackifier	26.7
Benzoflex 9-88 plasticizer	13.0
Irganox 1010 antioxidant	0.3
Test Properties	
RBSP, °C	62
180° peel, steel, lb/in.	2.1
T-peel adhesion to PET, lb/in.	2.4
90° quick tack, lb/in.	0.8
Room temp hold power 1 kg, 1 in.^{2}, 25°C, min	4
Brookfield Thermosel viscosity, 177°C, cP	430
Repulpability, neutral conditions,[a] %	100
Repulpability, alkaline conditions,[b] %	100

[a] *73°F, pH 7*
[b] *73°F, pH 11*

Table 5

Nonwoven Product Assembly Adhesive Using *Eastman AQ* 1350

Ingredients	Wt %
Eastman AQ 1350	60.0
Staybelite Resin-E tackifier	34.7
Benzoflex 9-88 plasticizer	5.0
Irganox 1010 antioxidant	0.3
Test Properties	
RBSP, °C	77
180° peel adhesion, lb/in.	3.4
T-peel adhesion to PE, lb/in.	2.4
90° quick tack, lb/in.	0.07
Room temp hold power 1 kg, 1 in.^{2}, 25°C, min	1,300
Brookfield Thermosel viscosity, 177°C, cP	1,120
Repulpability, alkaline conditions,[a] %	100

[a] *73°F, pH 11*

Table 6

Pressure-Sensitive Adhesives Using *Eastman AQ* Water-Dispersible Polyesters

	Formulation, Wt%	
Ingredients	**A**	**B**
Eastman AQ 1350	94.7	—
Eastman AQ 14000	—	69.7
Staybelite Resin-E tackifier	—	10.0
Benzoflex 9-88 plasticizer	5.0	20.0
Irganox 1010 antioxidant	0.3	0.3
Test Properties		
RBSP, °C	96	94
180° peel adhesion, lb/in.		
Steel	8.1	3.4
Polyethylene	—	0.67
Polypropylene	—	1.6
PET	—	6.5
90° quick tack, lb/in.		
Steel	1.7	3.8
Bond paper	—	0.8
Copy paper	—	1.0
Kraft paper	—	1.0
Room temp hold power, 1 kg, 1 in.², 25°C, min	2,000	1,800
Brookfield Thermosel viscosity, 177°C, cP	22,000	21,000
Repulpability, neutral conditions,[a] %	100	70
Repulpability, alkaline conditions,[b] %	100	100

[a] 73°F, pH 7
[b] 73°F, pH 11

Table 7

Nonwoven Adhesive Formulations

	Wt %		Wt %
Eastman AQ 2350	75	*Eastman AQ* 2150	70
Staybelite Resin-E	14.7	*Staybelite* Resin-E	19.7
Benzoflex 9-88 oil	10	*Benzoflex* 9-88 oil	10
Irganox 1010	0.3	*Irganox* 1010	0.3
Test Properties			
Viscosity @ 177°C, cP	6,750		1,400
RBSP, °C	72		65.3
T_g (DSC), °C	–3		–1
Loop tack, lb/in.	1.5		1.6
180° peel, lb/in.	6.4		6.7
T-peel on PE, lb/in.	5.1		1.4
Water-dispersibility	100%		100%

Figure 1 indicates thermal color stability of each *Eastman AQ* branched polyester after samples were aged at 80°C for 100 hours in a forced-air oven. This photo shows the excellent thermal stability of these polyesters.

Figure 1

Thermal Stability of *Eastman AQ* Branched Polyesters

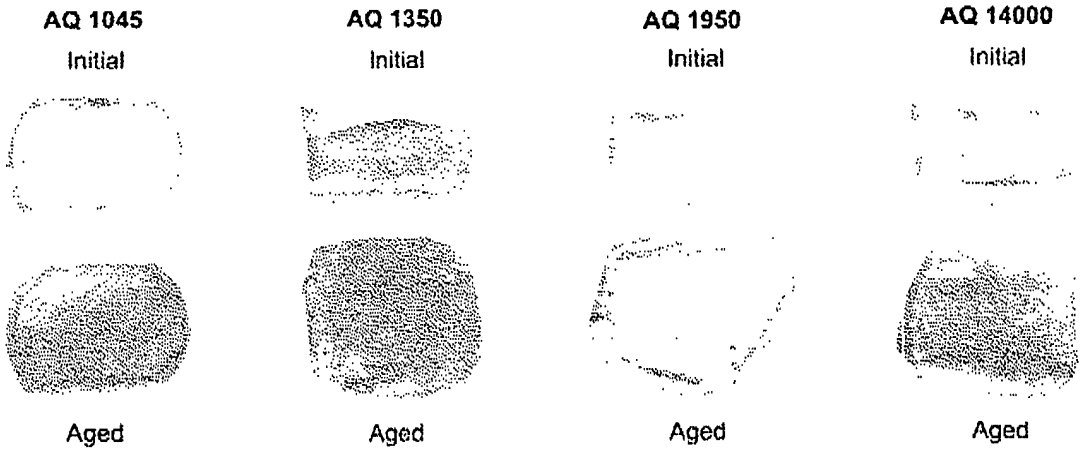
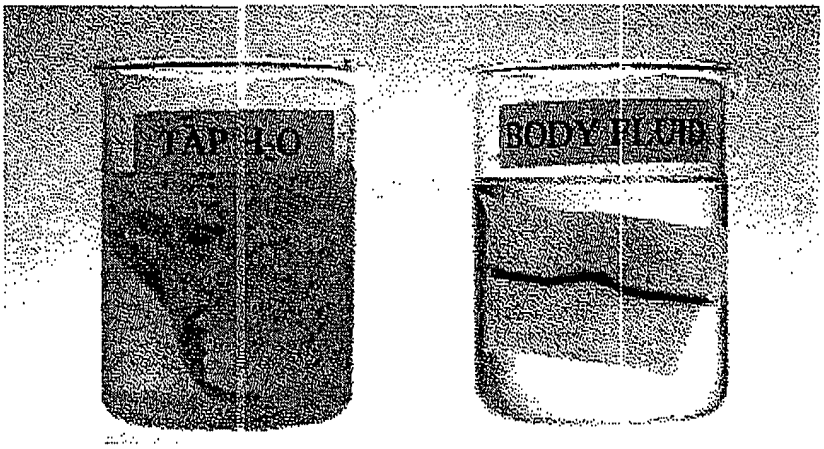


Figure 2 shows the resistance of *Eastman AQ* 1350 polyester to ionic solutions. This photo depicts two beakers, one filled with tap water, the other filled with 0.2-*M* ionic solution similar to human body fluids. Dyed *Eastman AQ* 1350 laminated onto nonwoven material was placed in each beaker for 8 hours. The tap water readily dispersed the polyester, while in the ionic solution the AQ 1350 remained nondispersible.

Figure 2

Ionic Solution Stability of *Eastman AQ* Branched Polyesters



List of Suppliers

Eastman AQ 1045, a 4,500-cP melt viscosity water-dispersible branched polyester	Eastman Chemical Company
Eastman AQ 1350, a 35,000-cP melt viscosity water-dispersible branched polyester	Eastman Chemical Company
Eastman AQ 1950, a 95,000-cP melt viscosity water-dispersible branched polyester	Eastman Chemical Company
Eastman AQ 14000, a 400,000-cP melt viscosity water-dispersible branched polyester	Eastman Chemical Company
Eastman AQ 2150, a 15,000-cP melt viscosity, odorless water-dispersible linear polyester	Eastman Chemical Company
Eastman AQ 2350, a 39,000-cP melt viscosity, odorless water-dispersible linear polyester	Eastman Chemical Company
Staybelite resin-E tackifier	Eastman Chemical Company
Piccо 6100 aromatic tackifier	Eastman Chemical Company
Benzoflex 352 solid benzoate ester plasticizer	Velsicol Chemical Corporation
Benzoflex 9-88 liquid benzoate plasticizer	Velsicol Chemical Corporation
Cyanox 1212 secondary antioxidant	American Cyanamid
Irganox 1010 hindered phenol antioxidant	Ciba-Geigy

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